THE PROBLEM OF MATERNAL MORTALITY

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I. THE PROBLEM STATED

SINCE 1911-15, when the maternal death-rate was four per thousand live births, there has been each year a tendency for the maternal mortality rate in England to increase or to be maintained. From time to time the Minister of Health has called attention to this fact, and the Press has published its commentaries, accompanied by medical and lay articles and correspondence. The various degrees of alarm or surprise expressed by medical men, lady "welfare workers," and others, as well as the confident prescription of remedial measures have become the familiar annual aftermath of the publication of the Registrar-General's and Ministry of Health's reports.

An examination of these reports during the past ten years generally reveals a persistent similarity. Their main features may be grouped under the following heads.

(*a*) After a congratulatory insistence that a "notable victory has been won since the beginning of the century in halving the infant death-rate," usually described as "one of the best tests of health progress" (Sir Kingsley Wood, Parliamentary Secretary to the Ministry of Health, October 5th, 1927) attention is called to:

(*b*) "The situation revealed by the present maternal mortality rate in this country, which is certainly disturbing and gives cause for concern" (*Idem.* 1927). Similarly, in 1934, the Minister of Health again called attention (House of Commons, June 20th, 1934) to the prevailing high incidence of maternal mortality, which has not been reduced during the period since antiseptic methods were first introduced. On the other hand, while the maternal death-rate as a whole continues to increase, and shows the highest recorded for thirty years (it was 4·42 per one thousand live births for England and Wales), the rate varies in different districts, and as between rural and urban districts in the same areas. In the county of Middlesex the rise has been from 3·85 deaths per one thousand births in 1932 to 4·77 deaths per one thousand in 1933.* While returns show a rising maternal mortality rate they also show a diminishing birth-rate and a decrease in the infant mortality rate, which has reached the lowest recorded. No attempt has been made to link these accompanying factors in an etiological survey, beyond a hazarded opinion that "there must be operating some growing adverse factor or factors, possibly concerned with changing habits or mode of life."†

(*c*) In the search for the causes of maternal mortality and puerperal complications, stress has been laid on the importance of maintaining a strict asepsis. Yet an examination of the reports shows conclusively that the increase in the total maternal death-rates cannot be attributed to any corresponding increase in the deaths from puerperal sepsis, and that specific infection cannot be cited as an operative factor to account for the general increase. In England, as in the United States, maternal deaths from non-puerperal causes associated with and aggravated by childbirth either remain static or tend to increase. Although an improvement in technical methods and an increase in hospitalization has been anticipated as a means whereby to combat the evil, medical opinion has at the same time tended to show an increasing lack of unanimity about the cause of maternal mortality.

(*d*) In spite of an admitted etiological failure in arriving at the causes of maternal mortality, no lack of enthusiasm has been

* Report by Dr. J. Tate, Medical Officer of Health for Middlesex.

† *Idem.*

shown in medical and lay quarters in proposing increased obstetrical and hospital services to arrest the unabated maternal death-rate, which traditional methods, in spite of a greatly increased expenditure, have in the past proved ineffective in arresting.

II. THE DEMOGRAPHIC APPROACH TO THE PROBLEM, AND THE USE OF CORRELATIONS

It is then an undeniable fact that, in spite of all the efforts of public health authorities and of increased hospitalization, the maternal mortality rate continues to rise. It is one of the many problems of population in which, for its elucidation, the physician must join with the demographer, anthropologist, biologist, sociologist, and the statistician. This means that the problem cannot be divorced from the problems of a lowering birth-rate, of a lowering infant mortality rate, of a postponement in the nuptial age, of an increase in induced abortions, due to the dread of pregnancy and the ineffective use of contraceptives, and to economic factors which are largely responsible for the increasing reluctance on the part of women in all but the lowest economic strata to bear large families or any families at all.

It has not been generally recognized that these phenomena are world-wide among civilized peoples and that, if investigated in relation to one another, they are explainable.

In all these departments of research mistaken opinions based on a faulty diagnosis are prevalent, because of a failure to appreciate that the determining factors in the total situation are correlated, and cannot be determined in isolation. As an instance could be mentioned the very prevalent opinions, that are currently accepted without any evidence, on the effects of contraceptives on fertility, it being generally assumed, from opposite points of view, that the use of contraceptives and the wide dissemination of birth-control propaganda are responsible for the lower fertility rate.

With regard to the problem we are primarily considering, references are frequently made to the growing use of analgesic methods in labour, and, more relevantly, to operative methods of delivery, increasingly resorted to when there is insufficient indication for interference. Contrary to general and popular assumptions these can be shown to have contributed to, rather than to have reduced, the high maternal death-rates in precisely those countries where the greatest interest has been shown in this problem.*

Associated with the phenomena of a later age of marriage of both sexes, and of an increase in celibacy, is the change in the adult and mating sex-ratio in civilized populations. It is well established that when the high peak in the growth of population has been reached, the death-rate will overtake the birth-rate, within a calculable period not far distant, and inaugurate a period of population decline. Not only does this tendency affect the age-grouping of the population whereby the proportion of young to old diminishes, but the adult and mating sex-ratio is also affected in such a way as to bring about an increase in the proportion of adult males to adult females of marriageable age. This decrease in the proportion of marriageable females, and the postponement in the nuptial age, tends to operate unfavourably on the marriage rate and to increase the number of celibates.

III. WORLD REVIEW

In the United States maternal mortality appears to have increased during the first quarter of the century.† It also increased during the first two decades in Germany, Scotland, and Sweden. During the same period it remained stationary in some fifteen other European countries.

Basing our comparisons on the 1901-10

* It is not denied on the other hand that obstetricians are beginning to appreciate the correctness of this view. Cit.: "The Responsibilities of the Obstetrician in the Problems of Population," by Dr. G. W. Kosmak, Editor, *American Journal of Obstetrics and Gynecology*. *Ex.* Proceedings Second General Assembly of the International Union for the Scientific Investigation of Population Problems; ed. G. Pitt-Rivers, 1932.

† *Cit.*, Woodbury, R. M., "Maternal Mortality"; U.S.A. Dept. of Labour; Children's Bureau, *Bulletin* No. 158, 1926.

averages in New Zealand, Australia, United States, Scotland, France, Spain, Belgium, and Switzerland, maternal mortality averaged between five and six per one thousand live births. This rate is roughly twice as high as it was in Sweden, Italy, and Norway, where it averaged less than three.* Since 1920, where available records are complete, the following comparisons may be made, though for different periods:

Low rates (1923-7): Denmark 2·6; Norway 2·8; Finland 3·1. (1925-7): France 2·5; Holland 2·4. (1922-6): Italy 2·8.

High rates (1921-5): U.S.A. registration area 8·3; (1923-7): Belgium 5·6; Australia 5·5; Germany 5·1; South Africa 4·9; New Zealand 4·8; Switzerland 4·4.

While standards of accuracy and statistical methods vary among different countries, making international comparisons in rates a matter of considerable difficulty, the correlations and inverse correlations in all countries having a well-established bureau of the census can be well supported by similar correlations established by statistical comparisons between different districts over periods of time in the same country. For purposes of internal comparison the careful reports furnished by the statistical and medical health authorities in the United States of America are of great value, particularly since the United States has been widely held to show one of the highest puerperal death-rates in the civilized world.

A recent review by the New York Academy of Medicine Committee on Public Health Relations† has again emphasized the failure to effect any reduction in maternal mortality, more noticeable in relation to the general death-rate, and in the infant death-rate. Public health work appears to have effected reductions in infant mortality and in diseases of the respiratory system and the alimentary tract; on the other hand there has been an actual increased mortality in infantile diarrhœa and enteritis, congenital debility and malformations,* and in the cancer rate of the general population.

On previous occasions I have called attention to figures which showed that in New York State, in spite of the great extension of public health centres and maternal welfare clinics, there was no corresponding fall in maternal mortality.†

During the 1915-25 period in New York State the deaths from puerperal causes numbered 15,876, representing a death-rate of 58·5 per ten thousand total births, or the death of one mother in every 171 births; while one in every nine deaths of women between the ages of 15 and 44, irrespective of conjugal state, was due to puerperal causes.

In the age-group 25-9 maternal mortality accounted for one in six deaths from all causes, being the second most frequent cause of death, the first being tuberculosis. The fact which I am most concerned to emphasize, however, is that during this period deaths from puerperal causes had actually increased in the urban districts while they had decreased in the rural. Neither antenatal care nor obstetrical services succeeded in lowering the rate, although during the same periods the infant death-rate fell steadily.

In accounting for this variation and the lower maternal mortality in rural as compared with urban districts, it had to be admitted that the rural practitioner usually lacks facilities for the needless obstetrical interference which has been suggested as one of the leading causes of excessive mortality.‡ Whatever conclusions may be drawn from the facts, they can contribute little to support demand for increasing the establishment of obstetrical clinics and hospitalization.

Among the causative factors cited by medical statisticians to account for the increase in maternal mortality mention may be made of the continued reduction in the

* Pitt-Rivers, *Clash of Culture*, pp. 83-4.

† *Maternal Mortality in New York City, 1934*, published by The Commonwealth Fund. Investigations into 2,041 cases.

* The Australian Commonwealth Bureau of Census Statistics include congenital debility and malformations as a classified cause of infant death.

† DePort, J. V., *Maternal Mortality and Still Births in New York State, 1915-25*; New York, 1928. *Cit.*, Review, Pitt-Rivers, EUGENICS REVIEW, October 1928.

‡ DePort, *op. cit.*

size of families, which gives a greater proportion of first confinements. Reference is also increasingly given to the assumed increasing frequency of induced abortions and in the frequency of efforts to avoid childbirth after pregnancy has begun, and, as has already been mentioned, of the growing tendency on the part of women to demand instrumental interference and the desire to make childbearing as easy and painless as possible. In this connection reference may be made to the inquiry into 2,000 cases attended in the St. Bartholomew's Hospital district, which showed that septic infection followed instrumental delivery in ten times the number of cases following normal delivery.*

IV. THE ABORTION RATE AND THE USE OF CONTRACEPTIVES

In view of frequent references to the use of abortifaciants and to induced abortions as a factor conducive to subsequent puerperal complications, some mention should be made of the demographic indications which bear on this subject. In the first place it must be recognized that ineffective contraceptives lead either to abortion or to unwanted pregnancies and illegitimate births. Since the evidence for any rise in the illegitimacy rate is frequently challenged, the following figures are offered for what they are worth. The rises are noticeable in the same countries, and no comparisons are made between different countries where different customs obtain.

According to the 1929 census for England and Wales the proportion of illegitimate births rose from 4·50 per cent. in 1928 to 4·55 per cent. in 1929. The maximum since 1901 was reached in the exceptional war year of 1918, but the proportion of illegitimate to total births in the period 1901-5 was given as 3·95 per cent.

The live illegitimate births registered in 1929 was 29,307. But in relation to the abortion rate, for which we have no figures, though all the indications suggest a rise, we have to remember that a large proportion of the abortion rate is potentially a reduction in the total illegitimacy rate. Furthermore, only a proportion of ante-nuptial or extra-nuptial conceptions result in illegitimate birth. It is clear that a large proportion of marriages following ante-nuptial conceptions is not in anticipation of marriages already arranged, but is forced on the parties by the condition of the woman and the failure of contraceptive methods used. In this connection Coghlan's study of the New South Wales vital statistics for the decennial period of 1891-1900 is of interest.* Twenty-two thousand out of 85,000 marriages during the period were contracted after conception had taken place. Coghlan shows that in every 1,000 first-born children, 510 are of post-nuptial conception, and of the remainder, or ante-nuptial conceptions, rather less than half are legitimate and rather more than half, or 257, are illegitimate. The proportion of seventh-month children which may, according to this calculation, have been erroneously included in the ante-nuptial conceptions, is very small, and could not appreciably affect the proportions.

From the census figures for England and Wales, comparing the rates for 1921 and 1929, we find in the birth-rate per one thousand total population: 22·4 per one thousand in 1921, and 16·3 per one thousand in 1922, or a decrease in the birth-rate of 6·1 per one thousand. The illegitimate rate was 1·02 in 1921, compared with 0·74 in 1929; equivalent to a drop of only 0·28 per one thousand. That is to say, there was a decrease in the legitimate birth-rate of 5·82 compared with a decrease of 0·28 in the illegitimate rate. Thus, taking the nearest integer, we find that, out of every twenty-four fewer births per four thousand of the total population only one fewer birth per four thousand of population represents the decrease in the rate of illegitimacy.

The proportionate decrease in illegitimacy is shown to be appreciably less than the decrease in legitimate births. It compares as 704 legitimate births in 1929 to one thousand in 1921, according to the corrected ratio by standard age rates, as against 804 illegitimate births in 1929 to one thousand in

* *Interim Report of the Departmental Committee on Maternal Mortality and Morbidity, 1930.*

* T. A. Coghlan, *The Decline in the Birth-rate of New South Wales.*

1921. It must be allowed that this affords some evidence of a fairly substantial rise in the comparative rate of illegitimacy, apart from the illegitimate or extra-nuptial conception rate, for which we have no figures. It also affords some indications that the induced abortion rate, for which we also have no figures, must be assumed to have increased at least proportionately. While it is manifestly impossible to estimate the number of self-induced and " illegal " abortions resulting in injury though not in death, it may be noted that of the 1,956 deaths directly due to child-bearing investigated by the Departmental Committee on maternal mortality between 1928-30, 168, or 10·5 per cent. of the total, were classed under abortion. The deaths due to criminal abortion recorded by the Registrar-General in 1928 totalled 57, while during the same year clinically induced abortions followed by death from sepsis numbered 224.

The suggestion made here, which further research may determine, is not that the presumed increase in the abortion rate can be held to be an operative factor in the maintenance of a high maternal mortality rate, but rather that it has tended to increase the sterility rate amongst the ante-nuptial or unmarried women, in addition, of course, to any other cause of sterility already operative, such as gonorrhœa.

V. MATERNAL MORTALITY AND INFANT MORTALITY—INVERSE CORRELATIONS AND CONCLUSIONS

Quite unreasonably, the reduction in the rate of infant mortality has been hailed by medical men as well as laymen as evidence of a higher standard of national health and fitness. For instance, Sir Arthur Newsholme wrote: " infant mortality, the deaths of children under one year of age, is the most sensitive index of social welfare and of sanitary improvement which we possess." During the first two decades of the twentieth century New Zealand led the world with the lowest infant mortality rate and had the highest maternal mortality rate. New Zealand had the lowest infantile death-rate (1922) of 42 per one thousand live births, followed by Australia with 53. At the other end of the scale Chile, in 1914, showed the highest white-infant death-rate in the world, of 286, while in the 1906-10 period it was 315. The average for the white races was (1901-10) about 150, and for the negroes of the United States 241 for males and 206 for females.

Throughout Europe and America reports have shown a tendency for a higher infant mortality in urban than in rural districts. There is also a tendency in European countries for infant mortality to increase downwards along the social scale. The countries showing the lowest infant mortality rates, during the early periods of recording before 1900, have also been the countries that succeeded in making the greatest percentage reductions during the first decade of the twentieth century.* In England and Wales infant mortality declined from 109 in 1911-15 to 74 in 1929. New Zealand, the country with the lowest infant mortality rate, showed at the same time (1910-20) the highest maternal mortality rate of about six per one thousand live births, followed by Australia with the next highest maternal mortality rate, while Chile had the lowest maternal mortality rate amongst the white races. Public health work has certainly reduced infant mortality, but it is precisely in those countries where the reduction in infant mortality has been effected that the maternal death-rate is correspondingly high. In England as in the United States the maternal death-rate has actually increased in the urban districts compared to the rural districts in the same states in the same countries; that is to say, it has increased precisely where hospitalization is greatest. Neither ante-natal care nor obstetrical services have succeeded in lowering the rate. Whatever conclusions may be drawn, this is a statement of fact which cannot be denied. In New Zealand, where European obstetrical methods have been introduced among the Maoris, the consequence appears to have been to favour an increasing tendency of puerperal complications among the Maori

* East, *Mankind at the Cross-roads.*

women. Yet, over the same periods in the same countries the infant death-rates have fallen steadily. In England we have reached the lowest infant death-rate (under one year of age) and the highest maternal death-rate over a period of thirty years.

In both New Zealand and Australia, which led the world in a low infant mortality rate, cancer was annually responsible for more deaths (1917-21) than could be assigned to any other cause except diseases of the heart. Comparing the cancer mortality rates in England, Australia and New Zealand, the actual annual rate, as well as the rate of increase during the ten-year period ending 1921, is higher in the same order that the infant death-rate is lower. Chile, on the other hand, with the highest infant mortality rate of any white country, showed one of the lowest rates of cancer mortality. The next highest cause of infant mortality in Australia and New Zealand is assigned to congenital debility and malformations. Here again there is no sign of decrease. Since 1920 nearly half the deaths of children under one year of age in Australia are attributed to congenital causes. New York figures, as already mentioned, show an increased mortality in infantile diarrhœa and enteritis. The mortality figures do not, however, represent the gravity of the eugenic aspect of the question, since for every infant death due to congenital causes there are many survivors who, if they reach maturity, suffer permanently from the handicap of a congenital defect.*

The report issued by Sir James Galloway's Committee on the National Standard of Physical Fitness as the result of an analysis of medical board examinations, 1917-18, showed that two in every three of the men of military age (17-18) failed to reach the not very high standard which qualified them as A1 or fit to shoulder a rifle in the firing-line. It is estimated that one in 120 persons is feeble-minded, one in 200 is insane, one in every ten too sickly or feeble-minded to be capable of supporting themselves.† In the year 1933 there was a total loss of 29,000,000 weeks' work, equivalent to over half a million persons for twelve months, due to illness, for which insurance benefit was payable.

Taking the maternal mortality rates 1901-10 averages already referred to in New Zealand, Australia, United States, Scotland, France, Spain, Belgium, Switzerland, Italy, Sweden, and Norway, the groups with the lower maternal mortality have the higher infant death-rate. The latest figures from Canada show the same inverse tendencies. Where, as already stated, the infant death-rate has been most conspicuously reduced, the group of infant deaths from congenital causes and malformations remains unaffected.

We are led to the following conclusions. " The significance is not so much that at any one time and in any one district a low infant and a high maternal mortality are most frequently co-present, but that the rate of maternal mortality tends to increase where the infant mortality decreases, and that the lowered infant mortality only results in a constitutional impoverishment of parturient mothers, reflected in a high or higher maternal mortality rate in the next generation, sixteen to thirty years later. The point is that medical services and obstetrical advances cannot and do not help. It is quite unreasonable to hail the reduction in the rate of infant mortality as evidence of a higher standard of national health and fitness, since the reverse is much nearer the truth. But the truth, of course, is likely to be unpopular, especially with medical officers of health, who wish to conceal the fact that their expensive services for alleviating symptoms are actually aggravating causes.

" We have succeeded in lowering the infant mortality rate at the price of a high maternal mortality rate and a constitutional and functional impoverishment of the quality of our breeding mothers. Survival of the strains of pregnancy and parturition depends far more on constitutional fitness and stamina than on medical preparation and obstetrical assistance. The child's chances of survival, however, are increasingly dependent, not

* *Cit.*, Pitt-Rivers, *Clash of Culture*, ch. v.

† *Cit.*, Mental Deficiency Committee of 1929, and reference by Lord Horder in address, *Eugenics and the Doctor*, pub. *B.M.J.*, Dec. 9th, 1933.

upon its constitutional and hereditary robustness, but upon its protection from bacterial attack and the artificial and medical assistance it receives. In short, we save the weak or defective potential mothers at birth and during childhood, who become increasingly unfitted themselves to survive the test of giving birth. The only remedy is the eugenic one of caring for the finer stock rather than subsidizing the diseased and defective."*

* Pitt-Rivers, *Weeds in the Garden of Marriage*, pp. 73-4.